

Uncle Sam, Guardian Over His People's Health

Studying the Measles and Infantile Paralysis by Means of Monkeys—Guinea Pigs and Diphtheria—The Horrors of Pellagra—Controlling Typhoid—Women Who Carry Disease—Mrs. X. and Typhoid Mary.

BY FRANK G. CARPENTIER.

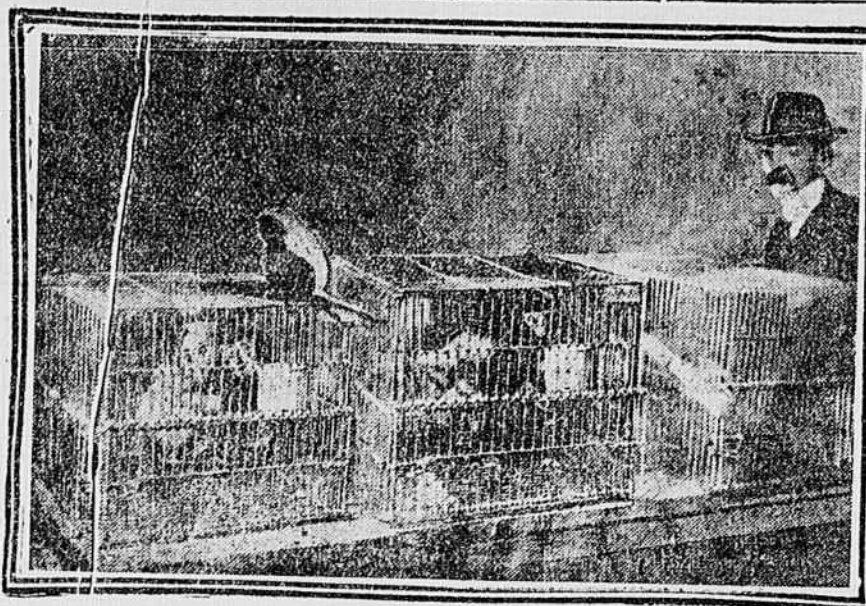
MONKEYS which have the measles, guinea pigs with the diphtheria, and rabbits with typhoid fever—these are some of the things to be seen in the great experiment station which Uncle Sam has established on the banks of the Potomac to keep disease away from his children. It is now ten years since a national bureau of public health was founded. The institution has proven to be of enormous value, and there is a possibility that it will some day be made a Cabinet department with a secretary at its head. As it is now, the bureau is controlled by the secretary of the Treasury. Its superintendent is Surgeon-General Walter Wyman, whose life has been spent in fighting the great diseases which afflict the nation. It is to him that we owe the movement now being made against tuberculosis, pellagra and typhoid fever, to the government regulations as to the sale of viruses and toxins, and also to the establishment of the hygienic laboratory whose work I describe further on in this letter.

The Government as a Doctor.

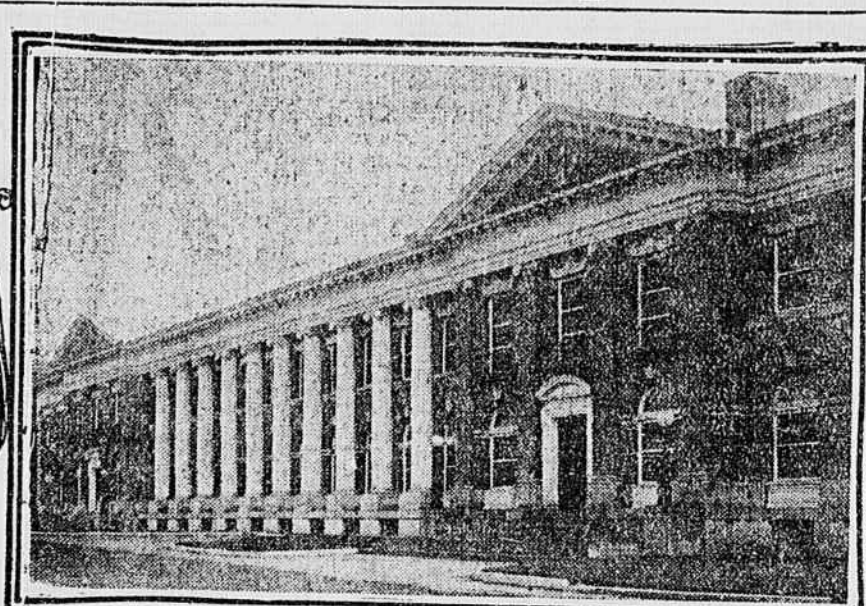
In fact, Uncle Sam is now one of the great doctors among the nations. He has scores of scientists who are investigating diseases and seeking new drugs to cure them. At Panama he has practically wiped out malaria and yellow fever, and here at home he is showing us how to control typhoid, diphtheria and that great white plague known as consumption. The government is trying to keep diseases out of the country. It has its medical examiners at every port of Europe where immigrants are inspected before they are allowed to start for the United States, and it has other doctors to look them over when they land. No person who has an infectious disease is now allowed to enter this country, and during the past summer the immigrants from the Mediterranean have been bacteriologically tested to see that cholera is kept away.

I doubt whether there is in any part of the world an institution of medical research more important than that which the government has here at Washington. I have visited the Wellcome laboratories at Khartoum, in the Sudan. They are devoted to tropical diseases—to the black water fever, the sleeping sickness and other horrors of the upper Nile and Middle Africa. There is a laboratory of medical research in London, and there are others in Paris, Berlin and Vienna. The most of these are private institutions, carried on with private capital. Our government institution, known as the hygienic laboratory, is backed by the nation, and it gets its appropriations from Congress. It is connected with the National Bureau of Health, and it has no grown that it is now one of the most important of the government undertakings.

The hygienic laboratory consists of several large buildings which are devoted to research work. It contains



Monkeys are kept in cages in a monkey house and are taken out as they are needed for investigation.



THE HYGIENIC LABORATORY.



Surgeon-General Walter Wyman.



IN THE HYGIENIC LABORATORY. AMONG THE ANIMALS USED ARE RABBITS.



DR. JOHN F. ANDERSON, Director of the Hygienic Laboratory.

chemical and other laboratories, specially fitted up rooms in which germs and microbes of all kinds are reared, rooms for the testing of diseases through a study of animals which have been infected with them, and all the machinery for modern medical investigation. It would take many columns to give a record of the various kinds of work now going on and a descrip-

tion of what has already been accomplished. In this letter I can mention only a few of the problems which are now being studied and some of the methods by which the scientists arrive at their conclusions.

Uncle Sam's Model Zoo.

One of the interesting features of the laboratory is its study of human diseases through animals of one kind or another. Indeed, in one respect the

institution might be called "Uncle Sam's Medical Zoo," for it has colonies of animals which the government keeps on hand in order that it may investigate through them the disease with which man is afflicted. These animals are inoculated with human blood taken from persons who have certain diseases. They thus catch the disease and through them the disease is studied and investigated. The sick

animal is given drug after drug in order that the right one for this special ailment may be discovered. Such animals are carefully watched, their symptoms are noted, and, if necessary, they are killed and cut to pieces to ascertain the origin and course of the disease and how it may be controlled as it affects man.

Among the animals used for this purpose are guinea pigs, rabbits, mice and monkeys. We are said to be descended from the monkey, and the monkey is the nearest to man in its make-up. It is only lately that it has been used in such investigations, but it is proving to be of enormous value. At present the government has on hand about three score of such monkeys, and it wants more. The monkeys used come from India. They are of a species known as the Rhesus, which is said to be of all monkeys, the best for this purpose. These Rhesus monkeys are little fellows not much bigger than a good sized fox terrier, and are quite as cunning, as mischievous and as interesting as any monkey you will see in the Zoo. They are kept in cages in a monkey house and are taken out here and there as they are needed in the investigations.

In the Guinea Pig Pens.

In another part of this same house is what I might call the guinea pig stock yards. This is composed of many little pens occupied by guinea pigs. A male and four females are allotted to each pen. They breed rapidly, and there are enough of them to keep up the 6,000 or more of these little animals which the laboratory consumes every year.

In another place there are rabbits, some of the softest gray and others as white as the ermine cloak of a prince. There are also dainty mice of the color of snow, which scurper and play about the little houses in which they are penned. Each kind of animal has its own place in the research work, and many of these which have been kept here have been of service in the remarkable discoveries made by this laboratory as to human diseases. All of these animals are carefully treated. They have well ventilated houses heated by steam, and the best of food that can be obtained. During my stay I saw them feeding the monkeys. The little animals were given bananas, bread, nuts and such other things as they specially like. The guinea pigs are kept fat on guinea pig dainties and the rabbits rejoice in green lettuce and cabbage. The animals are kept in perfect health, and as far as possible in good spirits in order that the diseases given to them may be directly diagnosed and studied.

Monkeys With the Measles.

Among the special human ills which Uncle Sam is now investigating is measles. He is doing this through monkeys which have been given the measles. Last June the British Medical Bureau stated that John Howard McFadden, the cotton magnate, who has given much money for the investigation of cancer, is about to turn his attention to the measles. It stated that the research would be undertaken in London, and I am told that an appropriation of perhaps \$500,000 is to be used for this investigation. In the meantime our government scientists by means of the monkeys, have made the discoveries which the McFadden Institute proposed to make, and that at no additional cost to Uncle Sam.

During my visit to the hygienic laboratory to-day I had a long chat with Dr. John F. Anderson, the director, who in connection with Dr. Joseph Goldberger, his assistant, has been carrying on the measles investigations. Dr. Anderson is known for his remarkable success in research work. He has done much in typhoid fever, pellagra and infantile paralysis. He has made many discoveries as to the effect of toxins and antitoxins, and as to the bacteria found in milk and the bacilli which cause consumption.

He tells me that it was some time before they were able to give the

measles to the monkeys. The experiment had been attempted in England and elsewhere, but had failed. At our national laboratory, however, the blood or serum used to inoculate the monkeys was taken from the human patient at just the time that the rash was coming out, or was used to come out. It carried the disease, and from this and other experiments we now know just when measles are infectious.

Dangers to School Children.

From these and other cases Dr. Anderson finds that the period of infectivity for measles, as far as the monkey is concerned, begins about the fourth day after the child has the disease, and that it disappeared as soon as the eruption has passed away and the temperature of the patient becomes normal. It must be the same with humans, but as it is now, when a child has the measles it is kept out of school for something like three weeks. These investigations show that twelve or fifteen days' time is all that is necessary, and it is probable that a less period would be safe. The disease is communicated from man to man, or rather from child to child, for it is to a large extent a child's disease, by means of the secretions which come from the nose and mouth. Certain monkeys which were inoculated with a fluid mixed with these secretions took the measles, and it is probable that the contagion comes largely from such secretions. The saliva and other secretions are mixed with the dust of the streets and thus taken into the system. For this reason children with the measles should be warned against expectoration.

Monkey Studies of Infantile Paralysis.

Among others of the recent investigation of the hygienic laboratory is infantile paralysis. This dread disease is like the measles in that it usually attacks little children. It is a disease of the spine, which paralyzes the child either in part or in certain of its members, and which often causes death. In Sweden out of 592 cases of children under sixteen years of age, one in four died, and in Massachusetts in 928 cases the State Board of Health found that 16 per cent. of the babies of less than one year failed to recover. Among the others, who got partially well, four had one thigh and leg paralyzed, eight had two legs paralyzed, and a number had a leg, arm and other members made dead, as it were.

Infantile paralysis is not a new disease. Evidence of it has been found in an Egyptian mummy which is almost 5,000 years old, and it has long existed in Europe. There have been a number of outbreaks of it in various parts of the United States within the past few years. Massachusetts had one in 1907, 1908, 1909 and 1910; Michigan one in 1907 and 1908; Pennsylvania one in 1910; and Oregon, South Dakota and Virginia were afflicted with it during that same year. It was in 1910 that it broke out here in Washington, resulting in 536 cases and about sixteen deaths. The youngest case was only four months old and the oldest sixty-four years.

In studying this disease there have been many attempts to give it to guinea pigs, rabbits, horses, sheep, dogs, cats, chickens, ducks and pigs. They have all failed, but it has now been discovered that it can be given to the monkey, and also that a monkey which has had the disease once cannot be given the disease again. It has

been found that a serum from the diseased monkeys will arrest the progress of the disease after it has developed, and monkeys have been vaccinated with this and thus made immune. It may be that this vaccination will some day be extended to children.

Infantile paralysis is found to come from a germ, but this germ is so small that it will go through a stone filter. The scientists have macerated the spinal cord of a monkey having the disease and have passed the water containing this through such a filter. A drop of the water when came from the filter was then injected into another monkey, and it got infantile paralysis.

It is also found that the secretions from the noses of the infected monkeys are infectious, and it is believed that the secretions of the nose and mouth are the way in which the disease may be transmitted from one person to another by direct contact and that it is contagious.

Pellagra Comes From Italy.

Another terrible disease which is causing much excitement in certain sections of the United States just now is pellagra. This, in the words of Surgeon-General Wyman, is "a veritable scourge in certain parts of Europe." It is found in Florence, Italy, Spain and Upper Egypt. In certain parts of Italy as many as 50 per cent. of the people have the disease, and a per cent. of these are mentally affected.

Pellagra has only recently come to America. It first broke out in the Southern States, but it is now found as far North as Philadelphia. It is estimated that we have something like 25,000 cases of it. Once caught it lasts a long time. It is frequently fatal, but there are instances in Italy where people have been afflicted with it as long as twenty-five years. Some suppose it to come from a poison, which affects the nervous system. It frequently causes insanity, and in its various stages brings diarrhoea, a weakening of the muscles, headache, insomnia, jerking of the knees and partial paralysis. It affects the skin, the stomach and the whole physical organization. In Alabama in 1907, there was an epidemic of it at the Mount Vernon Hospital for Colored Insane, in which there were eighty-eight cases and fifty-seven deaths.

No one yet knows just what causes pellagra. It has been thought to come from the eating of cornmeal made from improperly cured corn, but this is doubtful. Dr. Anderson tells me they have traced back many cases where corn was no part of their diet. Moreover, the scientists of the hygienic laboratory have fed rabbits, mice, guinea pigs and other animals upon the diet said to cause the disease and that without any effect whatsoever. Dr. C. H. Lavinder, who has investigated the subject in connection with the laboratory, does not think it can come from maize, and so far its origin is practically unknown.

Typhoid Mary and Mrs. X.

Some of the most interesting work of Uncle Sam's hygienic laboratory has related to typhoid fever. The corps of doctors here are ready to respond to any call from a typhoid epidemic provided the State or city where the typhoid is makes the call. At such time they go to the site of the epidemic and investigate its origin. Dr. Anderson tells me that typhoid can only come from the typhoid bacillus, and without this is present it cannot exist. One might eat bad fish or bad meat which did not contain this bacillus, and in such cases he could not have typhoid fever. However, this little being exists in most forms of sewage, it multiplies at an enormous rate, and it goes forth on its career of destruction like an army with banners. It is not true that it is common in water, though it sometimes comes from such a source and is laid in brackish water to make them swell up and look bigger.

The great danger of infection from typhoid fever lies entirely in that which comes from the patient when he is in certain stages of the disease, and as a rule these secretions disappear as soon as the man recovers. It has been found, however, that there are certain human beings who are bacillus carriers. They are loaded with typhoid and other diseases; but the disease has no effect upon them and they keep in health. By disease I mean that they have in them multitudes of the bacilli which cause the disease. One case of this kind was that of a cook known as "Typhoid Mary." She went from place to place and wherever she worked the people got the typhoid fever. There were several dozens of such cases, all caused by this catlike Mary.

Similar instances have been discovered by the Germans, and it is now found that there are certain people who are carrying about the cholera bacillus in the same way. For this reason all the sanitarians who are now coming from the United States are carefully examined, even to the making of a bacteriological analysis. A number of cholera carriers have been already discovered and sent back to Europe.

One of the German doctors speaks of a female typhoid carrier who had been distributing this disease for forty years, and another, the manager of an estate, who had been giving it out for ten years. During this time sixteen cases of typhoid had occurred on that estate. In the German statistics it is found that in about 100 female carriers 500 were housekeepers and fifty-six domestic servants. One was connected with a dairy.

Typhoid From Dairy Milk.

And this brings me to one of those chronic bacillus carriers who once spread a blanket of typhoid fever over a large part of West Washington. The epidemic occurred in the fall of 1908, and in less than three weeks the District of Columbia had 135 cases of typhoid. Of these fifty-four were in Georgetown, and upon investigation it was learned that all had been infected from a woman who had a farm near by. This woman I will call Mrs. X. The milk was traced to the consumers, and it was found that in nearly every case it had given them typhoid fever. The history of Mrs. X. was inquired into and it was discovered that she had had typhoid fever eighteen years previously. She was bacteriologically examined and it was shown that she still had typhoid bacilli in her. She was loaded with them, and was giving them the pans or handled the milk she unknowingly mixed some of these death-dealing bacilli with the products of her cows, and in this way they were taken into the stomachs of the consumer.

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